

IN THE CLAIMS:

1. (Currently Amended) An ultrasound transducer, comprising:

a housing;

a transducer module mounted in said housing, said transducer module operable
5 to transmit ultrasonic energy; and

an electronics assembly located in said housing and coupled with said
transducer and characterized by an interior portion and an exterior portion, said
electronics assembly including:

at least ~~one~~ two electronics ~~sub-assembly~~ sub-assemblies each having
10 at least one discrete electrical component affixed thereto, said at least one discrete
electrical component having a heat conductive surface and wherein said at least one
discrete electrical component of at least one of said at least two electronics sub-
assemblies is located in said interior portion such that said heat conductive surface of
said at least one discrete electrical component of said at least one of said at least two
15 electronics sub-assemblies faces the other of the at least two electronics sub-
assemblies; and

a first thermal conductor thermally coupled with said heat conductive
surface of said at least one discrete electrical component of said at least one of said at
least two electronics sub-assemblies and operable to remove heat generated by said at
20 least one discrete electrical component and move said heat from said interior portion
to said exterior portion.

2. (Original) The ultrasound transducer of Claim 1, further comprising a second thermal
conductor coupled with said first thermal conductor and located proximate to said
exterior portion and operative to remove said heat from said first thermal conductor.

- 25 3. (Original) The ultrasound transducer of Claim 2, wherein said second thermal
conductor further comprises a thermoelectric cooler.

4. (Original) The ultrasound transducer of Claim 3, wherein said thermoelectric cooler
comprises a Peltier device.

5. (Original) The ultrasound transducer of Claim 2, wherein said second thermal conductor is coupled with said transducer module and further operative to remove heat generated by said transducer module.
- 5 6. (Original) The ultrasound transducer of Claim 5, wherein said second thermal conductor is coupled with said transducer module by a solid thermal conductor.
7. (Original) The ultrasound transducer of Claim 5, wherein said second thermal conductor is coupled with said transducer module by a liquid thermal conductor.
- 10 8. (Original) The ultrasound transducer of Claim 1, wherein said first thermal conductor further comprises at least one thermally conductive sheet disposed over said at least one discrete component and extending from said interior portion to said exterior portion of said electronics assembly.
9. (Original) The ultrasound transducer of Claim 8, wherein said at least one thermally conductive sheet is coupled with at least one other thermally conductive sheet and a second thermal conductor by a thermally conductive connector.
- 15 10. (Currently Amended) The ultrasound transducer of Claim 1, wherein said at least one of said at least two electronics ~~sub-assembly~~ sub-assemblies further comprises a printed circuit board, said printed circuit board comprising said first thermal conductor.
- 20 11. (Original) The ultrasound transducer of Claim 1, wherein said first thermal conductor comprises at least one heat pipe.
12. (Original) The ultrasound transducer of Claim 1, wherein said first thermal conductor comprises a liquid cooling loop.
13. (Currently Amended) The ultrasound transducer of Claim 12, wherein said at least one of said at least two electronics ~~sub-assembly~~ sub-assemblies further comprises a

printed circuit board, said liquid cooling loop being embedded in said printed circuit board.

14. (Original) The ultrasound transducer of Claim 1, wherein said housing further comprises a transducer portion housing said transducer module and an electronics portion housing said electronics assembly, said housing further comprising a thermal separator operative to thermally isolate said transducer portion from said electronics portion.

15. (Original) The ultrasound transducer of Claim 14, wherein said thermal separator comprises a thermoelectric cooler, said thermoelectric cooler having a cold side located in said transducer portion and operative to remove heat from said transducer, and a hot side located in said electronics portion.

16. (Original) The ultrasound transducer of Claim 1, wherein said transducer module comprises a micro-mechanical based transducer.

17. (Currently Amended) A method of cooling an ultrasound transducer, said ultrasound transducer comprising a housing, a transducer module mounted in said housing and an electronics assembly located in said housing and characterized by an interior portion and an exterior portion, said electronics assembly including at least ~~one~~ two electronics ~~sub-assembly~~ sub-assemblies each having at least one discrete electrical component affixed thereto, said at least one discrete electrical component having a heat conductive surface and wherein the at least one discrete electrical component is located in said interior portion such that said heat conductive surface of said at least one discrete electrical component of said at least one of said at least two electronics sub-assemblies faces the other of the at least two electronics sub-assemblies, said method comprising:

generating heat by said at least one discrete electrical component; and
removing said heat from said interior portion to said exterior portion using a first thermal conductor thermally coupled with said heat conductive surface of said at

least one discrete electrical component of said at least one of said at least two
electronics sub-assemblies.

18. (Original) The method of Claim 17, wherein said removing said heat from said first
thermal conductor further comprises actively conducting said heat away from said
first thermal conductor using a thermoelectric cooler.

19. (Original) The method of Claim 17, further comprising disposing at least one
thermally conductive sheet over said at least one discrete component and extending
said at least one thermally conductive sheet from said interior portion to said exterior
portion of said electronics assembly.

20. (Currently Amended) The method of Claim 17, wherein said at least one of said at
least two electronics ~~sub-assembly~~ sub-assemblies comprises a printed circuit board
coupled with said at least one discrete electrical component, said method further
comprising embedding said first thermal conductor in said printed circuit board.

21. (Original) The method of Claim 17, wherein said first thermal conductor comprises at
least one heat pipe.

22. (Original) The method of Claim 17, wherein said first thermal conductor comprises a
liquid cooling loop.

23. (Currently Amended) The method of Claim 22, wherein said at least one of said at
least two electronics ~~sub-assembly~~ sub-assemblies further comprises a printed circuit
board, said liquid cooling loop being embedded in said printed circuit board.

24. (Previously Presented) The method of Claim 17 further comprising:
removing said heat from said first thermal conductor by a second thermal
conductor located proximate to said exterior portion and coupled with said first
thermal conductor.

25. (Original) The method of Claim 24, wherein said second thermal conductor is further coupled with said transducer module, said method further comprising removing heat generated by said transducer module by said second thermal conductor.

26. (Original) The method of Claim 25, wherein said second thermal conductor is coupled with said transducer module by a solid thermal conductor.

27. (Original) The method of Claim 25, wherein said second thermal conductor is coupled with said transducer module by a liquid thermal conductor.

28. (Original) The method of Claim 17, wherein said housing further comprises a transducer portion housing said transducer module and an electronics portion housing said electronics assembly, said method further comprising thermally isolating said transducer portion from said electronics portion.

29. (Original) The method of Claim 28, further comprising thermally isolating said transducer portion from said electronics portion using a thermoelectric cooler, said thermoelectric cooler having a cold side located in said transducer portion and operative to remove heat from said transducer, and a hot side located in said electronics portion.

30. (Currently Amended) An ultrasound transducer comprising:
a housing;

a transducer module mounted in said housing; and

an electronics assembly located in said housing and characterized by an interior portion and an exterior portion, said electronics assembly including at least one two ~~electronics sub-assembly~~ sub-assemblies each having at least one discrete electrical component affixed thereto, said at least one discrete electrical component having a heat conductive surface and wherein said at least one discrete electrical component of at least one of said at least two electronics sub-assemblies is located in said interior portion such that said heat conductive surface of said at least one discrete electrical component of said at least one of said at least two electronics sub-

assemblies faces the other of the at least two electronics sub-assemblies;

said ultrasound transducer further comprising:

means for removing heat generated by said at least one discrete
electrical component from said interior portion to said exterior portion using a first
5 thermal conductor means thermally coupled with said heat conductive surface of said
at least one discrete electrical component of said at least one of said at least two
electronics sub-assemblies.

31. (Original) The ultrasound transducer of Claim 30 further comprising:

10 means for removing said heat from said first thermal conductor means by a
second thermal conductor means located proximate to said exterior portion and
coupled with said first thermal conductor means.